ECOLOGICAL SURVEY OF THE PROPOSED DEVIL'S ROCK RESEARCH NATURAL AREA SHASTA-TRINITY NATIONAL FORESTS, CALIFORNIA

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INTRODUCTION

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The Devil's Rock Candidate Research Natural Area (DRCRNA) lies in the extreme southeastern Klamath Mountains on the Shasta Lake Ranger District of the Shasta-Trinity National Forests. It was nominated to represent the California black oak (*Quercus kelloggii*) target element for the Pacific Southwest Region. In June 1984 a reconnaissance report was submitted outlining the values of the area (McDonald et al. 1984). The area is adjacent to the Hosselkus Limestone CRNA , abutting a portion of its western side. These two CRNAs have since been combined (as of 1987) to form the Hoselkus Limestone RNA, which is currently undergoing the final steps toward establishment (Keeler-Wolf 1988a). This report acts as a supplement to the ecological survey contracted for the originally proposed Hosselkus Limestone CRNA (Keeler-Wolf and Keeler-Wolf 1975). It stresses the values of the California black oak and related vegetation types found in the eastern portion of the soon to be established Hosselkus Limestone RNA (maps 2 and 3).

Access:

The DRCRNA is accessible from its western side by several Forest Service roads (map 1). It is approximately 33 miles (53 km) from the Low Pass Creek area along the western boundary of the RNA to the junction with Interstate Highway 5. From this junction it is approximately 20 miles (32 km) to Redding, the location of the Shasta-Trinity National Forests Supervisor's Office. The distance between Redding and Low Pass Creek may be driven in about one and three-quarters hours.

The road 35N60 between Interstate 5 and the McCloud River Bridge (approximately 17 miles or 27 km) is asphalt. Beyond the McCloud Bridge the road is dirt (34N17). After crossing the Squaw Creek Bridge near the Squaw Creek Forest Service Station one may turn south on road 35N02 for 1 mile (1.6 km) to the Chirpchatter Campground, a logical staging area for entry into the RNA. This campground is not correctly indicated on the Bolli Bokka Mtn SE topo sheet or the Forest recreation map, being actually in the SE 1/4 of Section 20 and the adjacent NE 1/4 of Section 29 T35N, R2W.

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The RNA may also be accessed from the east via road 34N17. This road continues past the Squaw Creek Station, eventually crossing the Pit River and intersecting Highway 299. The route between the Squaw Creek Station and Highway 299 is 27 miles (43 km) long. From the junction with Highway 299 it is approximately 35 road miles (56 km) to Redding.

The principal entry route to the DRCRNA is the Low Pass Creek jeep road, about 1 mile (1.6 km) south on road 35N02 from the Chirpchatter Campground. This road (listed as trail 1W21 on maps 2 and 3) travels eastward and, as of June 1988, was passible by small four wheel drive vehicles to its terminus along the western side of the DRCRNA in the NE1/4 Section 28 T35N, R2W. Although this road will be blocked upon designation of the RNA, it will continue to be the best access route to the area (see Maps 1, 2, and 3). From the end of the jeep track, trail 1W21 continues and meets with trail 2W21, which turns west and meets with the jeep road west of Alder Spring. Trail 1W21 also continues NE to Brock Butte at the northern end of the RNA. In the SE 1/4 of Section 28 T35N, R2W trail 2W22 branches off of the jeep road and drops down into the Flat Creek drainage. Trail 2W22 meets with trail 2W16 in the NW 1/4 Section 34 T35N, R2W, which follows Flat Creek south along the eastern boundary of the RNA to Lake Shasta. Trail 2W22 also joins with the Ripgut Creek trail (2W15), along the eastern side of the CRNA, if followed upstream along the main branch of Flat Creek.

The extensive network of trails shown on the topo map (see map 3) gives a false sense of facility of access to much of the CRNA. All of the foot trails mentioned above have not been brushed out or blazed for many years and in many places it is of no use to follow them. In some cases it is very unlikely a trail ever existed where one is indicated on the map. This is true for the route of 2W16 from its junction with 2W22 to Shasta Lake. This latter trail does exist, but follows the banks of Flat Creek and does not ascend the valley slopes to the west of the creek, as shown. Large areas are extremely difficult to access and the abundance of poison oak (*Toxicodendron diversilobum*) throughout much of the RNA is a deterrent to cross-country travel.

PRINCIPAL DISTINGUISHING FEATURES

The DRCRNA, lying to the east of the prominent, rugged band of Hosselkus Limestone is comparatively gentle terrain underlain primarily by shale. It covers ca. 2005 acres (811 ha) with elevations ranging from ca. 1400-3250

ft. (427-991 m). This land is dominated by the valleys of Flat and Ripgut creeks. These creeks drain southward into the Pit River Arm of Shasta Lake. Within the area there is a range of environments from mesic lower valleys dominated by Douglas-fir (*Pseudotsuga menziesii*) with lush riparian thickets of dogwood (*Cornus sessilis*), white alder (*Alnus rhombifolia*) and other species; to xeric upper south-facing slopes dominated by chaparral species and Digger pine (*Pinus sabiniana*). Between these mesic and xeric extremes are extensive stands of California black oak forest, canyon live oak (*Quercus chrysolepis*) forest, and Brewer oak (*Quercus garryana* var. *breweri*) scrub. Viewing this area from a prominent point such as the top of Brock Butte (photo1) one can immediately sense the great extent of oak dominance. Vegetation dominated by the target element, California black oak, occurs on virtually all slope exposures and ranges from small-boled, even-aged stands to older monarchs intermixed with old growth Douglas-fir and ponderosa pine.

Fire has clearly been an important influence. The typical uniform canopy of oaks has resulted from extensive crown fires dating back approximately 75-80 years. Most of these oaks are under 20 inches (51 cm) diameter breast height (dbh) and between 40 and 60 ft. (12-18 m) tall. However, in sheltered areas some black oak attain heights of over 80 ft. (24 m) and dbhs of up to four feet (1.2 m).

JUSTIFICATIONS FOR ESTABLISHMENT

California Black Oak:
The excellent representation of the California black oak element is the principal justification for establishment. Black oak forest is typically a fire-adapted vegetation which requires regular burning to stimulate resprouting of basal underground rootstalks and to open the understory for successful seedling germination (McDonald 1980). Much of the area has undergone fires of sufficient frequency and intensity in the past to have promoted the widespread dominance of this type on not only the hotter south-facing slopes, but on east-, west- and even occasionally north-facing slopes. The more sheltered exposures often show evidence of Douglas-fir succession, while the xeric exposures show colonization by conifers such as Ponderosa pine (*Pinus ponderosa*) and Digger pine. The understories of the various exposures also differ, creating a variety of sub-types within this typically rather uniform vegetation type.

The black oak element for Region Five is represented by several established or candidate RNA's in the Peninsular Range Province (Cahuilla Mountain RNA), the North Coast Range Province (Devil's Basin Candidate RNA), and the Southern Sierra Province (Big Grizzly Candidate RNA). However, the element is not represented by any other candidate or established RNA in the Klamath Mountains Province (Keeeler-Wolf 1988). The extensive California black oak stands in the DRCRNA cover a larger area on more varied slope exposures than the other other black oak areas under current consideration for RNAs. This area includes a diversity of stocking densities, and subtypes unequalled on other Region Five black oak areas. Thus, the area is a showpiece for this target element in California.

Biogeographical Significance:
the geographical location of the DRCRNA near the juncture of the Klamath Mountains and the Sacramento Valley provinces creates some unique juxtipositions of various plants and animals. The coastal element of the Douglas-fir-dominated forests is prevalent in the shaded canyons of the RNA. Although approximately 105 miles (169 km) from the nearest point along the coast, many typical species of the mesic western Klamath Mountains occur here. These include *Viola ocellata, Aruncus vulgaris, Acer circinatum, Taxus brevifolia,* and *Lomatium dissectum*. Many of these species occur near their most inland localities at the DRCRNA (Munz 1968). Animals such as the Pacific giant salamander (*Dicamptodon ensatus*), black salamander (*Aneides flavipunctatus*), tailed frog (*Ascaphus truei*), and Chestnut-backed chickadee (*Parus rufescens*) are also near their most inland localities in the vicinity of the RNA (Stebbins 1985, Grinnell and Miller 1944). Conversely, the area is within 10 miles (16 km) of the northern end of California's Great Central Valley and the xeric south-facing slopes contain vegetation dominated by plants typical of the summer-dry foothills of California. Consequently many species such as Sonoma sage (*Salvia sonomensis), Collinsia tinctoria,* California buckeye (*Aesculus californicus),* bush poppy (*Dendromecon rigida),* flowering ash (*Fraxinus dipetala),* snowdrop bush (*Styrax officinalis* var. *californica),* and western spicebush (*Calycanthus occidentalis)* reach their northern limits within a few miles of the RNA. Along with them are animals typical of the California foothills such as the California newt (*Taricha californica*), striped racer (*Masticophis lateralis*), and Nuttall's woodpecker (*Picoides nuttallii*) (Stebbins 1985, Grinnell and Miller 1944).

Diverse Riparian Vegetation and Stream Life:
The streamside vegetation of Ripgut and Flat creeks is well-developed and is composed of a number of woody and herbaceous species. The low, but relatively constant volumes of these creeks in undisturbed, forested watersheds contributes to the high quality of the riparian growth. Flooding is minor and thus, disturbance of the streamside vegetation is minimal. Certain portions of Flat Creek are choked with herbaceous thickets of umbrella plant, (*Peltiphyllum peltatum*). The lush riparian vegetation contrasts strongly with the xeric upper slopes (photo 2).

The creeks are important breeding sites for such species as California newt, Pacific tree frog (*Hyla regilla*), foothill yellow-legged frog (*Rana boylei*), and possibly tailed frog (*Ascaphus truei* is known from Nosoni Creek a few miles to the west). These amphibians are supported by numerous freshwater invertebrates, and in turn, support such predators as western aquatic garter snakes (*Thamnophus couchii*, photo 3).

Cultural Value:
In addition to the palentological and biological values, the DRCRNA is adjacent to one of the most significant archaeological sites in northern California, Squaw Creek. Ancient multi-level village deposits dating back at least 6500 years have been excavated within 1.5 miles (2.4 km) of the CRNA (Clewitt 1974). Although no excavations or thorough search for artifacts have been conducted within the area, several Indian habitation sites in caves in the southern part of the Hosselkus Limestone RNA have been discovered (Hirschfeld 1975). The most recent Native American tribe to occupy the area was the Wintu (LaPena 1978).

CLIMATE

The DRCRNA is in the extreme southeastern portion of the Klamath Mountains Province near their juncture with the Sacramento Valley. The former is typically an area of high precipitation and montane climate, the latter is typified by relatively low precipitation with high summer and moderate winter temperatures. Consequently, the DRCRNA enjoys a blend of Klamath Mountains and Sacramento Valley climates. Temperatures, particularly in the summer are high, but precipitation is also high.

No weather recording stations exist in or adjacent to the area. The nearest station recording precipitation is the Pit River Powerhouse #5 at an elevation of 1458 ft. (444 m). This site is located approximately 11 miles (18 km) northeast of the RNA at a latitude and longitude of 40° 59'N., 121° 59' W. This station has been taking percipitation data since 1943. The 42 year average annual precipitation for this station is 77.02 inches (1956 mm). Approximately 18 miles (29 km) southwest of the center of the RNA is Shasta Dam (40° 43' N, 122° 25' W) at an elevation of 1075 ft. (328 m). This site has been taking both precipitation and temperature data since 1941. Precipitation at Shasta Dam averaged 61.92 inches (1573 mm) between 1941 and 1985.

The following tables summarize the climatological data for a 12 year period from these two stations.

Table 1: Summary of temperature data (°F) for Shasta Dam from 1974 through 1985.

year	$\bar{x}$ ann. temp.	highest temp. (w/date)	lowest temp. (w/date)	$\bar{x}$ Jan. temp	$\bar{x}$ July temp.	#days between last spring & 1st fall frost
'74	62.0	104(8/5)	29(1/6)	43.9	79.0	365+
'75	---	109(7/25)	30(11/29)	47.4	79.6	238
'76	62.6	115(7/28)	31(3/3)	48.4	83.1	365+
'77	61.9	112(8/1)	27(1/17)	45.9	81.4	292
'78	62.2	113(8/10)	28(12/29)	48.1	81.5	296
'79	62.1	106(9/16)	29(1/30)	45.2	80.5	324
'80	62.1	108(7/28)	33(12/31)	49.5	79.4	365+
'81	63.1	115(8/8)	32(2/26)	48.1	82.6	365+
'82	59.8	105(8/23)	29(4/4)	40.7	78.3	226
'83	60.4	105(8/7)	31(12/23)	46.0	75.3	341
'84	62.2	108(7/5)	32(12/31)	50.2	84.9	275
'85	---	109(7/14)	---	46.7	85.3	---
aver.	61.8	109	30	46.7	80.9	

Table 2: Precipitation (inches) summary for a 12 year period for Pit River Powerhouse #5 and Shasta Dam.

year	Pit River #5			Shasta Dam		
	Jan.	July	total	Jan.	July	total
'74	23.51	2.38	80.04	15.96	4.03	65.90
'75	3.75	1.18	68.90	3.34	0.57	62.58
'76	0.70	0.17	28.68	0.74	0.00	27.99
'77	3.32	0.00	57.44	3.31	0.01	44.59
'78	28.41	0.28	76.95	32.67	0.04	77.76
'79	9.56	0.00	77.67	14.78	0.02	66.99
'80	15.58	0.34	72.61	6.35	0.00	61.94
'81	10.13	0.05	99.42	15.05	0.11	84.76
'82	7.30	2.07	94.28	8.80	0.59	73.87
'83	18.62	1.11	138.84	17.35	0.25	130.48
'84	0.42	0.26	60.35	0.58	0.03	43.01
'85	1.10	0.89	39.50	1.21	1.09	---
average	10.20	0.72	74.56	10.01	0.56	61.66

The temperatures at Shasta Dam are probably quite comperable to those at the lower elevations of the RNA. Table 1 indicates that the highest annual temperatures in the RNA average about 109 °F (42.8°C) while the lowest average about 30°F (-1.1°C). Frost is a relatively rare event at the lowest elevations and probably in about 1 in 3 years there are no days below freezing. Temperatures approximately 2000 feet (610 m) higher at the highest elevations, assuming a lapse rate of 3°F/1000 ft. in elevation (1.67°C/305 m) would thus give highest yearly temperatures of approximately 103°F (39.4°C), and lowest of about 24°F (-4.4°C).

Actual precipitation in the RNA is probably midway between the Shasta Dam and the Pit River Powerhouse #5 stations. Thus, the range between 60 and 70 inches (1524-1778 mm) indicated by the isohyets in Rantz (1972) for the

vicinity of the RNA is fairly accurate.

GEOLOGY

The two principal rock types in the Hosselkus Limestone RNA, limestone and shale were both deposited in the late Triassic (Irwin 1966). The Brock Shale is the dominant type in the DRCRNA. It is closely related to the limestone and in some places in the Brock Creek drainage (to the south of the DRCRNA) intergradation of shale and limestone may be seen. The shale is a less fossiliferous formation and only occasionally, usually in close association with limestone, are fossils found. Brock Shale is dark, massive argillite interlayered with tuff or tuffaceous sandstone. Where it outcrops on the upper ridges it may weather to reddish-brown.

The Brock Shale overlies the Hosselkus Limestone (McMath 1966). These rocks are the only Triassic rocks in the Klamath Mountains Province and have analogs in the northern and central Sierra Nevada (McMath 1966, Durrell 1987).

SOILS

The soils within the RNA are relatively complex, having been divided into six mapping units in the draft order 3 soils survey of the area (Shasta-Trinity National Forest, 1982). The following map unit descriptions are keyed to thr accompanying soil map (Map 4) of the HLRNA indicated by the abbreviation following the unit name.

a. Neuns-Marpa very gravelly loams complex, 60-80% slopes (1 Fd): This mapping unit is made up of 50% Neuns very gravelly loam and 30% Marpa very gravelly loam with 20% inclusions of Deadwood family, Madonna soils, and extremely gravelly Typic Xerothents. Neuns soils have the following characteristics: surface soils from 0-11 inches (0-28 cm) brown to light brown very gravelly sandy loam or very gravelly loam with weak to moderate medium granular structure, 40% gravel, neutral to slightly acid; subsoil 11-23 inches (28-58 cm) light brown very gravelly sandy loam with weak fine subangular blocky structure, 45% gravel and cobbles, medium to slightly acid; substratum from 23-40 inches (58-102 cm), fractured, hard metamorphic rock.

Marpa soils are characterized by a surface layer from 0-7inches (0-18 cm) which is brown to yellowish brown very gravelly loam or very gravelly heavy loam. They have moderate medium granular structure, 40% gravel, with a strongly to slightly acid reaction. The subsoil ranges from 7-32 inches (18-81 cm) and is brown to light brown very gravelly heavy loam to very gravelly clay loam, moderate subangular blocky structure, 40% gravel, and is strongly to slightly acid. The substratum is 32-40 inches (81-102 cm) and is hard, fractured metamorphic rock.

This mapping unit is found locally on steep slopes in the Ripgut Creek drainage.

b. Neuns-Kindig very gravelly loams complex, 60-80% slopes (1Kd): This unit is composed of 50% Neuns very gravelly loam (previously described) and 30% Kindig very gravelly loam with 20% inclusions of Kinkel soils and Deadwood family.

Kindig very gravelly loam is characterized by having the following characteristics: Surface soil; 0-9 inches (0-23 cm) dark brown to strong brown very gravelly loam, weak granular structure, 55% gravel, medium acid to neutral. Subsoil; 9-45 inches (23-114 cm) yellowish brown to strong brown very gravelly loam, weak subangular blocky structure, 40% gravel, medium acid to neutral. Substratum; 45-50 inches (114-127 cm) highly fractured metamorphic rock.

c. Deadwood family-Rock outcrop complex, 60-80% slopes (5Fd): This unit consists of 60% Deadwood family and 30% Rock outcrop, with 10% inclusions of Typic Xerothents, extremely gravelly rubblelend.

Deadwood family has the following characteristics: Surface soil 0-6 inches (0-15 cm) brown to dark yellowinsh brown very gravelly loam or very gravelly sandy loam, weak granular structure, 40% gravel, medium to slightly acid. Subsoil; 6-14 inches (15-36 cm) yellowish brown to light brown very gravellly loam to very gravelly sandy loam, weak subangular blocky structure, 45% gravel, medium to slightly acid. Substratum; 14-20 inches (36-51 cm) fractured hard metamorphic rock.

The local Rock outcrop is made up primarily of metamorphic Brock

Shale. It does not have a soil profile.

d. Marpa-Neuns very gravelly loams complex 60-80% slopes (17Ad): This unit consists of 60% Marpa very gravelly loam and 30% Neuns very gravelly loam (both previously described) with 10% inclusions of Deadwood family and rubbleland. It occupies a small portion of the SE 1/4 of Section 27 and adjacent Section 26.

e. Marpa-Goulding family association, 40-60% slopes (17 Bc): This unit consists of 60% Marpa very gravelly loam and 30% Goulding family with 10% inclusions of Neuns, Rock outcrop, metamorphic, and Deadwood soils. Both of the principal soil types have been previously described.

f. Marpa-Goulding family associations, 60-80% slopes (17 Bd): This unit consists of 60% Marpa very gravelly loam and 30% Goulding family with 10% inclusions of Neuns, rock outcrop, metamorphic, rubble land, and Deadwood soils. It is essentially the same as the previous unit except it occurs on steeper slopes. Locally it is most prevalent in the upper Flat Creek drainage.

VEGETATION

The following is a brief account of the major vegetation types occurring at the DRCRNA. These are depicted on the vegetation map (Map 5). The code numbers in parentheses following the names are keyed to the type description in Holland (1986).

a. Northern mixed chaparral (Holland code 37110). This vegetation as it occurs locally is a variant of the type described by Holland as 37110. Locally it is a mixture of species from northern mixed chaparral and montane chaparrals, particularly shin oak brush (Holland code 37541).

Hardtack (*Cercocarpus betuloides*) tends to dominate on the most xeric rocky sites. Among the dominant species of woody plants on less rocky sites are Brewer oak (*Quercus garryana* var. *breweri*), California mock orange (*Philidelphus lewisii* ssp. *californica*), California buckeye (*Aesculus californica*), Digger pine (*Pinus*

sabiniana), holly-leaf redberry (*Rhamnus crocea* ssp. *ilicifolia*), Fremont silktassel (*Garrya fremontii*), flowering ash (*Fraxinus dipetela*), redbud (*Cercis occidentalis*), snowdrop bush (*Styrax officinalis* var. *californicus*), ocean spray (*Holodiscus discolor*), poison oak (*Toxicodendron diversilobum*), chaparral clematis (*Clematis lasiantha*), *Berberis dictyota* , and chaparral honeysuckle (*Lonicera interrupta*). Numerous herbs also occur in the rock crevices. These include; *Collinsia tinctoria, Lesingia nemaclada, Selaginella hanseni, Penstemon azureus, Arabis breweri, Erysimum capitatum, Phacelia heterophylla,* and *Gallium nuttallii* .

This type of vegetation is most extensive on the limestone outcrops of the Hosselkus area to the west of the DRCRNA. Locally, only small patches exist on the steep southerly-facing slopes in Section 22 (50 acres). These patches are usually associated with areas of shallow rocky soil (rock outcrop within the Deadwood-Rock outcrop soil mapping unit). Some portions of canyon live oak-dominated vegetation on steep rocky west or SW-facing slopes is transitional with chaparral.

b. White Alder Riparian Forest (Holland 61510): This assemblage of species lines the deeper canyon bottoms, surrounds springs, and follows trickles up shady north slopes. It is best developed along the lower reaches of Flat and Ripgut creeks. It is typified by such species as white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), big-leaf maple (*Acer macrophyllum*), dogwood (*Cornus sessilis*), spicebush (*Calycanthus occidentalis*), and choke cherry (*Prunus virginiana* var. *demissa*). In sunny locations California grape (*Vitis californica*), greenbriar (*Smilax californica*), California pipevine (*Aristolochia californica*), and blackberry (*Rubus ursinus*) sprawl and climb over the trees and shrubs. In shadier canyon bottoms Pacific yew (*Taxus brevifolia*) and vine maple (*Acer circinatum*), may be locally common and *Cornus sessilis* tends to dominate (photo 4). Herbaceous understory species vary depending on amount of sun and water. Typical species are: chain fern (*Woodwardia fimbriata*), California spikenard (*Aralia californica*), umbrella plant (*Peltiphyllum peltatum*), common monkeyflower (*Mimulus guttatus*), and woodrush (*Luzula divaricata*).

c. Black Oak Forest (Holland 81340): Despite the fact that most of the oak vegetation at DRCRNA is dominated by California black oak, it is difficult to distinguish at a distance (e.g. aerial photos) between this species and two other common oaks, canyon live oak, and Brewer oak , which may also dominate locally. Thus, for the sake of accuracy on the vegetation map all oak-dominated vegetation will be classified under this general heading. With further study, parts of this type will undoubetedly more accurately referred to canyon live oak forest (Holland 81320), and possibly to shin oak (*Q. garryana* var. *breweri*) brush (Holland 37541). The reconnaissance report (McDonald et al. 1984) suggests that the area should actually be regarded as a joint California black oak and canyon live oak research area (note; canyon live oak forest is not considered at present a target type). However, black oak does cover substantially more area than canyon oak.

Oak-dominated vegetation in the RNA is largely a result of past widespread fires. Typically, the upper slopes of south, west and east exposures, with relatively deep soil and slope angles less than 45° are clothed in black oak. The majority of the upper slope oak forests appear to have stems no older than 100 years, with the average age at breast height being ca. 74 years (n=16). Growth rates and understory composition and development depend on slope exposure. Several sub-types of oak forest may be discerned. As no vegetation sampling was conducted for this survey, the descriptions of these sub-types are qualitative. Oak-dominated forest covers ca.1508 acres (610 ha).

On gentle to moderately steep west-facing slopes a black oak type occurs with a grassy understory dominated by *Elymus glaucus* with poison oak, California hazelnut (*Corylus cornuta* var. *californica*), snowberry (*Symphoricarpos mollis*), bedstraw (*Galium aparine*), White-flowered hawkweed (*Hieracium albiflorum*), *Trillium chloropetalum*, sweet cicily (*Osmorhiza chilensis*), gambleweed (*Sanicula crassicaulis*), California pipe vine (*Aristolochia californica*), and star flower (*Trientalis latifolia*). There may also be saplings of ponderosa pine and Douglas-fir. Some of the larger trees of black oak occur in this subtype with diameters of 2 ft. (0.61 m) and heights of 70 ft. (21 m), indicating optimum local growing conditions (photo 5).

On SE-facing slopes particularly on the W side of the RNA, black oak

may dominate in a forest with a higher percentage of ponderosa pine and a relatively sparse understory including *Iris tenuissima*, golden brodiaea (*Brodiaea lutea* var. *analina*), gold wire (*Hypericum concinnium*), *Collomia heterophylla*, *Pedicularis semibarbata*, *Viola lobata*, *Aira caryophyllaea*, *Silene campanulata*, *S. lemmonii*, and *Brodiaea multiflora*. The largest ponderosa pines are 2-2.5 ft. (0.6-0.8 m) dbh. This type of forest is clearly successional and whthout fire will change to ponderosa pine dominance in a few decades.

On SW-facing slopes near ridgetops black oak dominates a woodland of trees from 6-20 inches dbh (15-51 cm) with an understory of snowdrop bush (*Styrax officinalis* var. *californica*), *Melica californica*, *Carex multicaulis*, poison oak, and reproduction dominated by Douglas-fir and/or Digger pine. This type has a sparser understory than the W-facing subtype previously described. The Douglas-fir saplings have typically spilled over from adjacent sheltered exposures, while the Digger pine reproduction is more uniformly distributed. Mid-slope SW-facing slopes tend to have a scatered emergent layer of Digger pine from 70-100 ft. (21-30 m) tall over a continuous black oak cover of from 40-60 ft. (12-18 m) tall.

On SE-facing slopes black oak dominates in a forest with trees 12-18 inches (30-46 cm) dbh and 50-55 ft. (15-17 m) tall with a shrubby understory of snowdrop bush, Mock orange (*Philadelphius lewisii*), poison oak, redbud, and deerbrush (*Ceanothus integerrimus*). The herb layer is variable with some grassy openings dominated by *Melica californica* and *Elymus glaucus* (photo 6).

At highest elevations along gently sloping ridgetops black oak dominates over a grassy understory with *Festuca californica*, *Elymus glaucus*, *Microseris nutans*, *Senecio aronicoides*, *Silene lemmonii*, *Agoseris grandiflora*, *Daucus pusillus*, *Cynocurus echinatus*, *Hydrophyllum occidentale*, gambleweed, *Clarkia rhomboidea*, and miner's lettuce (*Claytonia perfoliata*). (Photo 7)

On NW-facing slopes black oak may dominate under conditions of relatively gentle slopes and deep soil. Here (photo 8) big leaf maple

and canyon live oak may occur as subdominants with a relatively dense shrubby understory of California hazelnut. Douglas-fir may occur as saplings and pole size trees, indicating a trend toward dominance by this species (photo 9).

A SW-facing flat with deep soil occurs in the SW 1/4 of Section 14. This flat ranges from ca. 2400-2750 elevation and covers about 100 acres. Although it was not visited, it is dominated by a dense stand of young black oak and may contain a different type of understory.

Off of the deeper soils black oak tends to become more spindly. In such an area on a steep E-facing exposure the black oak stems were only ca. 6 inches dbh (15 cm) and about 30 ft. (9 m) tall. In these situations the species typically co-dominates with canyon live oak.

At higher elevations with steep south exposures or on rocky shale ridges, black oak gives way to spindly stands of Brewer oak. These stands are typically only slightly larger than shrubs with stems 2-5 inches (5-13 cm) dbh and approximately 8-12 ft. (2.4-3.7 m) tall. In the DRCRNA most Brewer oak stands occur as small ridgetop patches in the northern half of Section 22 above ca. 2700 ft. These stands typically form abrubt alterns with black oak forest on adjacent sheltered exposures. Brewer oak stands are more extensive on calcareous soil in the Hosselkus Limestone area.

On very steep slopes of virtually any exposure canyon live oak tends to dominate, often in dense stands with little understory except scattered poison oak and hazelnut. The steep stands of canyon oak on sheltered locations (E-, and N-facing exposures) may have been spared from the fires which affected the majority of the area, and consequently are sometimes large - up to 3 ft. (1 m) dbh and 70 ft. (21 m) tall. Canyon live oak forest appears throughout the DRCRNA. Some of the most accessible stands are those along trail 1W21 in the SW 1/4 of Section 24.

The largest black oaks seen in the area were also in sheltered locations such as canyon bottoms or edges of ravines. These included some specimens up to 4 ft. dbh (1.2 m) and 85 ft. (26 m) tall. They usually occurred within mesic mixed coniferous forest.

d. Coast Range Mixed Coniferous Forest (Holland 84110): This forest is the most mesic vegetation in the RNA, occupying ravine bottoms and sheltered exposures throughout the RNA. It was called the low elevation mixed conifer forest in Keeler-Wolf and Keeler-Wolf (1975). It is not completely analogous to the Holland type 84110 because it does not typically contain such trees as sugar pine (*Pinus lambertiana*) or incense-cedar (*Calocedrus decurrens*). It is divisible into two sub-types; one which bears a greater resemblance to the mesic coastal forests dominanted by Douglas-fir, and one which is more similar to the xeric ponderosa pine-Douglas-fir type of the lower montane zone of the eastern Klamath mountains (e.g Sawyer and Thornburgh 1977). This type covers ca. 446 acres (180 ha).

The greatest dominance by Douglas-fir occurs in the canyon bottoms and lower N-facing slopes where, sheltered from crown fire for hundreds of years, the canopy has grown to heights of 150 ft. (46 m) in some places and dominant Douglas-fir attain dbhs of between 5 and 6 ft. (1.5-1.8 m). Typical dominant Douglas-firs are between 2 and 4 ft. (0.6-1.2 m) dbh and have such species as canyon live oak, big-leaf maple, and madrone (*Arbutus mernziesii*) as sub-dominants. These sub-dominants may be 3 ft. (1 m) dbh and over 80 ft. (24 m) tall. Beneath the taller trees is a understory of woody species including mountain dogwood (*Cornus nuttallii*), California hazelnut, ocean spray (*Holodiscus discolor*), ninebark (*Physocarpus capitatus*), poison oak, wood rose (*Rosa gymnocarpa*), and red-flowering currant (*Ribes sanguineum*). These woody species overly an herb layer including *Viola ocellata, Trientalis latifolia*, wild ginger (*Asarum hartwegii*), false solomon's seal (*Smilacina racemosa* var. *amplexicaulis*), California harebell (*Campanula prenanthoides*), wood fern (*Dryopteris arguta*), swordfern (*Polystichum munitum*), California maidenhair fern (*Adiantum jordanii*), and alumroot (*Heuchera micrantha* var. *pacifica*). The understory of the lowest valley-bottom Douglas-fir forests shared such species as *Cornus glabrata* and *Cornus sessilis* with the riparian zone (photo 10).

Higher up the north facing slopes and on more sheltered west and east-facing exposures Douglas-fir may give way to ponderosa pine as the dominant tree. In these situations black oak also becomes an important species and occasional individuals of sugar pine occur

(photo 11). In general shrub and herb cover is sparser than in the canyon bottoms and changes in composition to reflect the more xeric environment. Such species as white-leaf manzanita (*Arctostaphylos viscida*), poison oak, mahalia mats (*Ceanothus prostratus*), *Ceanothus lemmonii*, and *Lupinus albifrons* occur over a scattered low herbaceous cover of *Balsamorhiza deltoidea, Hieracium albiflorum, Apocynum pumilum, Lotus stipularis* ssp. *balsamifera, Lupinus albicaulis, Psoralea physoides, Carex multicaulis, Agoseris grandiflora, Festuca californica,* and *Horkelia tridentata*.

Both phases of the coast range mixed coniferous forest have sufficient overlap so as not to be easily descernable for aerial photo-based mapping.

BOUNDARY ADJUSTMENTS

Because of the combination of the DRCRNA and the Hosselkus Limestone CRNA into a single RNA, Forest planners and RNA comittee members have made several boundary adjustments for the sake of management of this large area (the combined total acreage of the Hosselkus Limestone RNA, 6439 acres [2608 ha] makes it the largest RNA yet to be established in California). The original boundaries drawn for the DRCRNA included all of sections 22, 26, and 27 and a small portion of section 14. The portion of section 14 was removed from later proposals for the DRCRNA because it is surrounded by private land. This part of Section 14 contains the large flat with black oak vegetation mentioned in the vegetation section.

The boundaries drawn for the Hosselkus Limestone RNA also exclude a large portion of Section 26 originally included within the DRCRNA. However, portions of sections 34 and 3 adjacent to the eastern side of the Hosselkus Limestone CRNA have been annexed. These areas are thought to duplicate the values of the portions of section 26 dropped from the final combined proposal and are more accessible.

Most of the lands surrounding the DRCRNA have been included in the Devil's Rock Roadless area. This area has been released from wilderness consideration as of 1984. However, because the area is not part of the timber producing base for the Shasta-Trinity National Forests, it is unlikely that it will be developed. Thus, the portions of

the original DRCRNA not included within the final boundaries of the HLRNA should remain in a pristine state available for study.

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CAPTIONS FOR PHOTOS ACCOMPANYING
SURVEY OF DEVIL'S ROCK CRNA

Photo 1: View to the south down Ripgut Creek drainage from the upper slopes of Brock Butte, just north of the DRCRNA boundary showing the extent of the black oak-dominated vegetation on most slope aspects. Note Douglas-fir dominance in valley bottom. Mt. Lassen in left distance.

Photo 2: Streamside vegetation along upper Flat Creek. Note umbrella plant (*Peltiphyllum peltatum*) surrounding small cascade.

Photo 3: Western aquatic garter snake (*Thamnophus couchii*) in riparian zone along upper Flat Creek. Several individuals of this species were seen along the creek and presumably fed on foothill yellow-legged and Pacific tree frogs.

Photo 4: Riparian thicket dominated by *Cornus sessilis* along small tributary of Flat Creek. Note mesic Douglas-fir-dominated forest in background with Pacific madrone.

Photo 5: West-facing black oak forest with understory dominated by *Elymus glaucus* with scattered shrubs of California hazelnut.

Photo 6: Snowdrop bush (*Styrax officinalis* var. *californicus*) a common shrub in the understory of relatively xeric black oak forest.

Photo 7: a high elevation ridgetop stand of California black oak with a grassy understory dominated by *Festuca californica, Elymus glaucus* and several annual and perennial herbs.

Photo 8: North-facing black oak stand with big-leaf maple subdominant and a dense layer of California hazelnut in the understory.

Photo 9: View across Flat Creek drainage to northerly-facing slopes with numerous young Douglas-fir indicating trend toward dominance of that species.

Photo 10: Douglas-fir dominated forest in ravine in Flat Creek drainage showing lush understory of *Cornus* spp. and other mesophylls indicating ecotone between riparian and coniferous forests.

Photo 11: A mixed forest on an easterly exposure within the Flat Creek drainage codominated by ponderosa pine, Douglas-fir, and California black oak indicating the trend toward more xeric coniferous forest on upper slopes in the study area.

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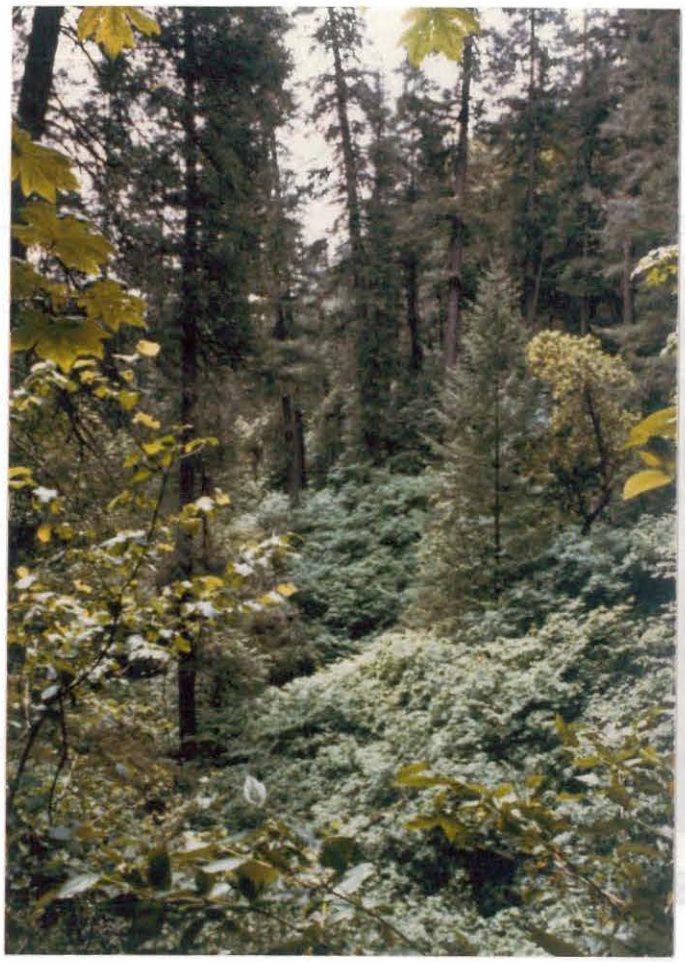

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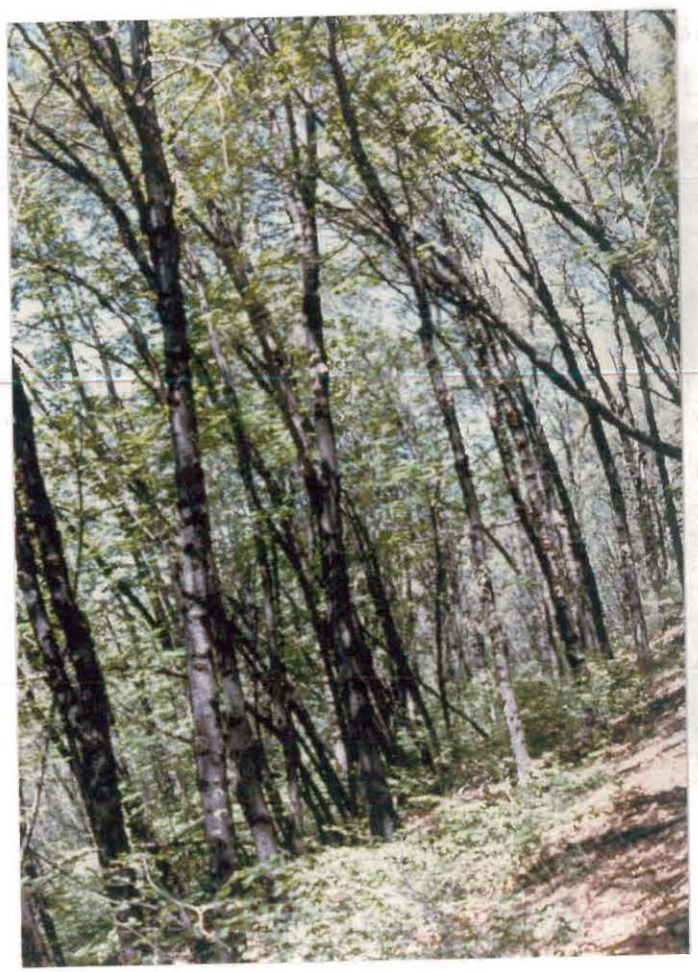

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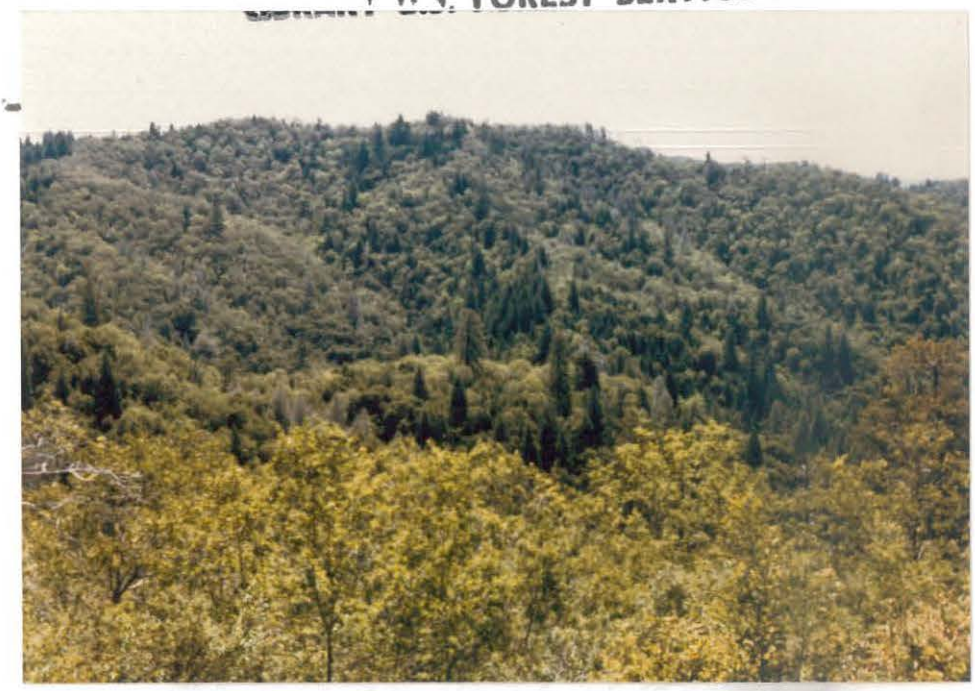

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APPENDICES

The following appendicies are excerpted from the draft establishment record for the Hosselkus Limestone RNA (Keeler-Wolf 1988a). These lists of plants and vertebrate animals include all species known or suspected from the RNA as shown on Map 2. These lists are not specifically for the Devil's Rock CRNA, although virtually all of the species in these lists not locally restricted to limestone occur there.

APPENDIX 1
VASCULAR PLANT LIST FOR THE
HOSSELKUS LIMESTONE RNA

This list is excerpted from the ecological survey (Keeler-Wolf and Keeler-Wolf 1975). The vegetation units defined in the list from the ecological survey are roughly equivalent to the ones used in this current report except that the type listed in the survey as low elevation mixed conifer forest is now termed Coast Range mixed coniferous forest, and the canyon riparian of the survey is now termed white alder riparian forest.

During the field work for the establishment record and survey of the Devil's Rock annex (June 7-10, 1988) an additional group of species was found. These are listed below. Taxonmy for both lists follows Munz (1968).

Cynosurus echinatus; common in oak woods
Nemophila heterophylla; oak woods
Hydrophyllum occidentale; shady oak woods
Clarkia rhomboidea; openings in oak woods
Allium campanulatum; limestone scrub
Brodiaea multiflora; oak woods
Ranunculus occidentalis var. *eisenii*; grassy understory in oak woods
Erodium cicutarium; occasional openings in oak woods
Delphinium nudicaule; oak woods
Vulpia (Festuca) myuros; open scrub
Collinsia tinctoria; limestone scrub
Lomatium leptocarpum; limestone scrub
Madia elegans; openings in oak woods and limestone scrub
Clarkia purpurea; limestone scrub
Sedum spathulatum; limestone scrub
Mimulus sp. annual yellow-flowered species, uncommon on limestone, taxonomic status being determined
Cheilanthes cooperae; limestone scrub
Trillium chloropetalum; oak woods
Galium aparine; oak woods
Brodiaea leutea var. *analina*; oak woods and drier mixed conifer forest
Hypericum concinuum; occasional drier mixed conifer and oak woods
Agropyron trachycaulum; occasional drier mixed conifer and oak woods

Mimulus kelloggii ; occasional scrub and drier oak woods
Silene campanulata var. *orbiculata* ; occasional oak woods
Pedicularis multipedunculata ; occasional drier mixed conifer forest
Tellima grandiflora ; occasional riparian and mesic mixed conifer forest
Lithophragma sp; uncommon mesic mixed conifer
Lathurus sulphureus ; occasional oak woods and sunnier riparian
Poa pratensis ; uncommon along road in Low Pass canyon
Lingusticum apiifolium ; occasional in semi-shade of mixed conifer
Cynoglossum grande ; occasional oak woods and mesic mixed conifer
Actaea rubra ssp. *occidentalis* ; uncommon, mesic mixed conifer
Polystichum munitum ; occasional mesic mixed conifer
Erythronium californicum ; occasional mesic mixed conifer
Goodyera oblongifolia ; uncommon mesic mixed conifer
Corallorhiza maculata ; rare mesic mixed conifer
Senecio triangularis ; rare, riparian along Flat Creek
Aruncus vulgaris ; occasional riparian along Flat Creek
Prunella vulgaris ssp. *lanceolata* ; occasional riparian
Draperia systyla ; occasional mesic mixed conifer
Pyrola picta forma *aphylla* ; uncommon in mesic mixed conifer
Habenaria elegans ; rare, mesic mixed conifer
Salix lasiolepis ; occasional sunny riparian
Fritillaria lanceolata ; occasional shady oak woods and mixed conifer
Sanicula bipinnatifida ; occasional openings in oak woods
Madia exigua; scrub and openings in oak woods
Euphorbia crenulata ; rare, oak woods
Quercus garryana var. breweri X chrysolepis; one patch seen in sheltered oak woods.
Cacalopsis nardosmia ; uncommon oak woods
Claytonia perfoliata ; uncommon oak woods
Bromus diandrus ; uncommon dry grassy openings in scrub and oak woods
Bromus tectorum ; upper elevation scrub near Brock Butte
Lotus stipularis ; occasional sunny openigs in oak woods
Poa scabrella ; uncommon, rocky understory of upper elevation oak woods
Arenaria douglasii ; uncommon, dry openings in scrub and oak woods
Lupinus andersoni ; occasional, oak woods
Galium trifidum var. *subbiflorum* ; occasional riparian and mesic mixed conifer
Microseris nutans ; common in grassy oak woods
Melica torreyana ; occasional mesic mixed conifer
Festuca elmeri ; oak woods

Trisetum cernuum ; oak woods
Trifolium ciliolatum ; open oak woods and scrub
Cryptantha torreyana ; occasional openings in oak woods
Delphinium depauperatum ; common in oak woods
Trifolium microcephalum; occasional limestone scrub
Trifolium variegatum ; limestone scrub
Symphoricarpos mollis ; common in oak woods

APPENDIX I:

LIST OF PLANTS IDENTIFIED FROM THE R.N.A..(AUG.31 TO NOV 1, 1975)

EXPLAINATION:

CFp= occuring in low elevation mixed conifer forest - Ponderosa pine type.

CFm = occuring in low elevation mixed conifer forest - mesic type

OW = occuring in oak woodland

S = occuring in scrubland (limestone or non-limestone)

R = occuring in canyon riparian association

W = weed of disturbed areas

FERNS AND ALLIES:

Selaginella hanseni S

Equisetum arvense R

Pteridium aquilinum var. pubescens CFp CFm OW

Pellaea mucronata S

Onychium densum S OW

Pityrogramma triangularis S OW CFm

Adiantum jordanii CFm S OW

Polystichum munitum var. imbricans OW CFm

Dryopteris arguta CFm

Cystopteris fragilis R

Woodwardia fimbriata R

Polypodium californicum R OW CFm

CONIFERS:

Abies concolor CFm

Pinus lambertiana CFp CFm

Pinus ponderosa CFp CFm OW

Pinus attenuata S OW

Pinus sabiniana S OW

Pseudotsuga menziesii CFm CFp OW

Calocedrus decurrens CFm

Taxus brevifolia R

FLOWERING PLANTS:

Calycanthus occidentalis R S

Clematis lasiantha S

Aquilegia formosa var. truncata CFm

Berberis pumila OW CFp

Berberis dictyota S OW CFp

Eremocarpus setigerus S W

Datisca glomerata R

Viola ocellata CFp CFm

Hypericum perforatum W R

Dendromecon rigida S

Dicentra formosa CFm R

Streptanthus tortuosus OW S

Arabis glabra CFm

Arabis breweri S

Erysimum capitatum S CFp

Stellaria media W

Cerastium viscosum W

Silene californica OW CFm

Montia parvifolia R CFm

Calyptridium umbellatum W CFp

Eriogonum nudum W OW S CFp

Rumex angiocarpus W

Polygonum hydropiper R

Styrax officinalis var. californica OW S

Dodecatheon hendersonii OW CFp

Trientalis latifolia R CFm

Plantago lanceolata W

Arbutus menziesii CFm

Arctostaphylos manzanita OW S

Arctostaphylos viscida S CFp OW

Frasera albicaulis ssp nitida CFp OW

Fraxinus dipetala S OW

Fraxinus latifolia R

Apocynum pumilum OW CFp

Asclepias cordifolia OW

Convolvulus occidentalis

Allophyllum divaricatum S OW

Collomia heterophylla CFp

Gilia capitata S OW CFp

Linanthus ciliatus S OW

Phacelia heterophylla S OW

Lappula echinata W

Mimulus guttatus S R

Verbascum thapsus W

Penstemon azureus S

Penstemon lemmoni S CFp OW

Antirrhinum breweri S OW

Castilleja pruinosa OW

Verbena lasiostachys W

Scutellaria californica CFm OW

Salvia sonomensis OW S

Monardella villosa ssp. sheltonii OW S

Dudleya cymosa R CFm OW

Heuchera micrantha var. pacifica R CFm OW

Phidelphus lewisii ssp. californicus CFm OW S

Whipplea modesta CFm

Ribes sanguineum CFm

Ribes lobbii CFm OW

Physocarpus capitatus CFm OW

Holodiscus discolor S CFm OW

Horkelia tridentata CFp OW

Potentilla glandulosa CFm OW

Cercocarpus betuloides S OW

Rubus ursinus R CFm OW

Rubus leucodermis R

Rubus parviflorus CFm

Rosa gymnocarpa CFm OW

Prunus emarginata S

Prunus subcordata S OW R

Prunus virginiana var. demissa R

Osmaronia cerasiformis CFm OW

Amelanchier pallida CFm CFp OW S

Cercis occidentalis R S OW

Lupinus albifrons CFp

Lupinus albicaulis CFp OW CFm

Medicago hispida W

Melilotus albus W

Trifolium repens W

Lotus stipularis ssp. balsamifera CFp

Psoralea physoides CFp OW

Vicia americana OW

Corylus cornuta var. californica CFm OW

Alnus rhombifolia R

Quercus kelloggii OW CFm CFp

Quercus garryana OW S

Quercus garryana var. breweri OW S

Quercus chrysolepis OW CFp CFm S

Salix lasiandra R

Zauschneria californica ssp. latifolia S

Epilobium paniculatum OW S

Asarum hartwegii CFm OW R

Aristolochia californica OW CFm R S

Rhamnus crocea ssp. ilicifolia S OW

Rhamnus rubra ssp. obtusissima CFm

Ceanothus integerrimus var. californica CFm CFp OW

Ceanothus lemmonii CFp

Ceanothus prostratus CFp

Arceuthobium campylopodium S CFm CFp

Phoradendron flavescens var. villosum OW

Aesculus californica S OW

Acer circinatum OW R CFm

Acer macrophyllum CFm R OW

Rhus diversiloba CFm CFp OW S R

Rhus trilobata CFp CFm OW

Aralia californica R

Sanicula crassicaulis OW CFm

Osmorhiza chilensis CFm

Daucus pusillus W OW S

Lomatium dissectum S

Angelica arguta CFm

Cornus glabrata R

Cornus nuttallii CFm OW

Cornus sessilis R

Garrya fremontii S CFm

Galium triflorum OW CFm

Galium bolanderi OW CFp

Galium nuttallii S CFp OW

Sambucus caerulea S

Symphoricarpos rivularis CFm R OW

Lonicera interrupta S

Lonicera hispidula var. vacillans CFm OW

Marah oreganus S OW

Campanula prenanthoides OW CFm

Wyethia angustifolia var. foliosa CFp OW

Balsamorhiza deltoidea CFp

Calycadenia truncata S OW

Eriophyllum lanatum var. grandiflorum S OW

Solidago canadensis ssp. elongata OW CFp

Chrysothamnus parryi ssp. latior OW CFp

Aster oregonensis W OW CFm

Erigeron inornatus OW

Lessingia nemaclada S OW

Achillea borialis ssp. californica S OW

Adenocaulon bicolor CFm

Arnica discoidea CFp

Senecio aronicoides OW CFp

Gnaphalium californicum OW

Gnaphalium microcephalum var. thermale OW S CFp

Eupatorium occidentale CFm OW

Eupatorium shastense S

Cirsium vulgare W

Cirsium pastoris OW S

Centaurea solstitalis W

Agoseris grandiflora CFp

Stephanomeria virgata OW W S

Sonchus oleraceus W

Hieracium albiflorum CFm CFp OW

Taraxicum officinale W

Smilacina racemosa var. amplexicaulis CFm OW

Disporum hookeri CFm R

Fritillaria recurva S OW

Smilax californica R CFM OW

Brodiaea congesta OW S CFp

Iris tenuissima OW CFm

Luzula subsessilis R

Cyperus acuminatus R

Carex multicaulis CFp OW

Bromus marginatus CFp OW

Bromus rubescens OW W S

Bromus mollis OW S

Festuca megalura S OW W

Festuca reflexa S W

Festuca californica OW CFp

Dactylis glomerata W OW

Melica californica S

Elymus glaucus OW CFm CFp

Hordeum hystrix W

Aira caryophyllea W OW

Avena barbata OW W S

Agrostis diegoensis OW

Stipa lemmoni OW S

APPENDIX 2

VERTEBRATES KNOWN FROM OR SUSPECTED IN THE HOSSELKUS LIMESTONE RNA

The following pages are taken from the appendix of Keeler-Wolf and Keeler-Wolf (1975). The list immediately below is an addendum to that list based on observations made during the field work for this establishment record from June 7 through 10, 1988. Authorities for the names are Stebbins (1985) for reptiles and amphibians, Robbins et al. (1983) for birds, and Ingles (1965) for mammals.

AMPHIBIANS:

California Newt *Taricha torosa*: Definitely known from the RNA in the Flat Creek drainage

REPTILES

Western Pond Turtle *Clemmys marmorata*: seen in puddle along road just west of RNA in Squaw Creek drainage.

Southern Alligator Lizard *Gerrhonotus multicarinatus*: definitely known from oak woodland in Flat Creek drainage.

Racer *Coluber constrictor*: definitely known from upper Ripgut Creek drainage within the RNA edge of scrub and oak woodland.

Western Aquatic Garter Snake *Thamnophus couchii*: definitely known from streamside forest along Flat Creek.

BIRDS:

Osprey: soaring over Gray Rocks, a regular breeder at Shasta Lake.

Pileated Woodpecker: heard in Madison Canyon.

Violet-green Swallow: common over Gray Rocks

Purple Martin: flock of 5 over Gray Rocks

Ash-throated Flycatcher: common in scrub and more open oak woods.

Olive-sided Flycatcher: coniferous forest Low Pass Canyon.

Orange-crowned warbler: fairly common in limestone scrub and oak woods.

Song Sparrow: along Squaw Creek just outside RNA

Yellow Warbler: willow thicket along Low Pass Creek

Northern Oriole: occasional in black oak woods

Brown-headed cowbird: heard at Chirpchatter camp just outside RNA

Anna's Hummingbird: Low Pass canyon and other areas of scrub and oak woods.

Rufous? Hummingbird: probably this species (possibly Allen's hummingbird) along Flat Creek.

Winter Wren: several singing in shady canyons of Flat Creek drainage.

Black-headed Grosbeak: fairly common in black oak forest and scrub.

Downy Woodpecker: oak woods in NE portion of RNA

Nuttall's Woodpecker: black oak woods NE portion of RNA

MAMMALS

Black Bear *Ursus americanus*: two individuals seen in RNA, both brown color phase. seen in coniferous forest and scrub on limestone.

Elk *Cervus canadensis*: an adult male with large rack seen in Brewer oak scrub in Gray Rocks area. Scat seen several places throughout the eastern part of RNA.

APPENDIX II: VERTEBRATES KNOWN FROM OR SUSPECTED IN THE R.N.A.

AMPHIBIANS:

Pacific Giant Salamander Dicamptodon ensatus: Larvae occur in pools in Madison and Bars Creeks. Probably also in Low Pass and Brock Cr.

Olympic Salamander Rhyacotriton olympicus: Possibly occurs in gravelly seeps along small streams (i.e. along Madison Canyon). Range parallels that of Tailed Frog who's nearest known location is in Nosoni Cr. ca. 3½ miles West.

Rough-skinned Newt Taricha granulosa: Likely to occur in the area in wooded canyons and streams.

California Newt Taricha torosa: An isolated population is known from the adjacent Squaw Cr. drainage, very likely to occur in the area.

Ensatina Ensatina eschscholtzi: Possible in wooded areas.

Black Salamander Aneides flavipunctatus: Known from moist rocks and caves in the Low Pass Creek area.

Shasta Salamander Hydromantes shastae: Known from Low Pass and the southern Gray Rocks, also from Madison Canyon - Limestone caves, moist rocky crevices, and under rocks at the bases of cliffs.

Tailed Frog Ascaphus truei: Known from Nosoni Creek, a few miles West of the R.N.A.

Western Toad Bufo boreas: To be expected in the area.

Pacific Tree Frog Hyla regilla: Known from the Squaw Cr. area.

Foothill Yellow-legged Frog Rana boylei: Found along streams, Low Pass Cr., Bars Gulch, and Madison Canyon. Probably also in Brock Cr.

REPTILES:

Western Fence Lizard Sceloporus occidentalis: Very common in oak woods, Ponderosa pine forest, and scrubland.

Sagebrush Lizard Sceloporus graciosus: Possible in rocky, scrubby areas.

Western Skink Eumeces skiltonianus: To be expected in woodland and streamside areas.

Western Whiptail Cnemidophorus tigris: Of possible occurence in scrubland

Southern Alligator Lizard Gerrhonotus multicarinatus: To be expected in woodland and scrubland.

Northern Alligator Lizard Gerrhonotus caeruleus : Fairly common in oak woodland and scrubland.

Rubber Boa Charina bottae: To be expected in moist forests and openings.

Ring-neck Snake Diadolphis punctatus: Occurs in the R.N.A. in wooded areas, under logs, and in caves.

Sharp-tailed Snake Contia tenuis: To be expected under logs, in woods or adjacent to open areas.

Striped Racer Masticophis lateralis Of possible occurance in scrubland.

Racer Coluber constrictor: Likely to occur in grassy areas and woodland borders.

Gopher Snake Pituophis melanoleucus: Occurs in oak woodland and scrubland as at the head of Low Pass Creek.

California Mountain Kingsnake Lampropeltis zonata: Known from area adjacent to the R.N.A. in the Squaw Creek drainage.

Common Kingsnake Lampropeltis getulus: Known from the Squaw Creek area.

Common Garter Snake Thamnophis sirtalis: Possible along streams in the R.N.A.

Western Terrestrial Garter Snake Thamnophis elegans: Riparian thickets and streamsides as at Low Pass Cr.

Western Aquatic Garter Snake Thamnophis couchi: Possible around streams.

Western Rattlesnake Crotalus viridis: Occurs in scrub, rocky areas and woodland.

BIRDS:

This list is limited to species actually observed in the R.N.A. The number of species which do occur either occasionally as vagrants, migrants or summer residents is undoubtedly much higher than the 43 species which we observed on four visits between Aug. 30 and Nov. 1, 1975.

Turkey Vulture: Seen soaring over the Gray Rocks area.

Sharp-shinned Hawk: Woodland in Low Pass area

Red-tailed Hawk: Soaring over Grey Rocks, Brock Cr.

Mountain Quail: Thickets and woodland- Alder Springs, Madison Cyn., etc.

Band-tailed Pigeon: Flock flying over Grey Rocks Oct. 1

Screech Owl: Low Pass Nov. 1

Spotted Owl: Oak Woodland along Brock Mtn. Road Sept. 1

Saw-whet Owl: Oak woodland, scrub, Brock Mtn. Road Sept. 1

Vaux Swift: Foraging over Gray Rocks Sept 1

Flicker: There is a substantial Fall influx in all habitats- Rare in Aug. and early Sept.

Acorn Woodpecker: Oak woodland, Low Pass area

Red-breasted (Yellow-bellied) Sapsucker: Mesic conifer and oak woodland Low Pass, Oct. 1

Hairy Woodpecker: Conifer forest- Madison Cyn. and Low Pass area

Western Wood Pewee: Madison Cyn. oak woodland and Ponderosa pine forest.

Stellar's Jay: Conifer forest throughout

Scrub Jay: Scrubby and oak-covered areas throughout

Chestnut-backed Chickadee: Oak woods, conifer forest throughout

Plain Titmouse: Oak woods Upper Low Pass Cr. Aug. 31

Bush-tit: Scrub and oak woods near Gray Rocks and Low Pass

Wren-tit: Scrub and wooded canyons in Low Pass and Alder Cr. areas

Red-breasted Nuthatch: Conifer forest throughout.

Brown Creeper: Mesic conifer forest Low Pass, Madison Cyn.

Winter Wren: Riparian thickets, Low Pass Nov.1

House Wren: Riparian thickets Low Pass Sept. 2

Bewick's Wren: Scrub and thickets in Low Pass and Brock Mtn. Road areas

Canyon Wren: Limestone cliffs and canyons- Low Pass, Gray Rocks etc.

Robin: Forest and woodland throughout. More common in Oct. and Nov.

Hermit Thrush: Riparian thickets, Alder Spr. Canyon, Oct. 1

Golden-crowned Kinglet: Oak and conifer forests Oct. and Nov.

Ruby-crowned Kinglet: Oak and conifer forests - Nov.

Solitary Vireo: Oak woods and Ponderosa pine forest- Aug. and Sept.

Hutton's Vireo: Canyon oaks- Low Pass area.

Warbling Vireo: Oak woods Aug. and Sept.

Orange-crowned Warbler: Riparian thicket, Low Pass- Aug. 31

Audubon's Warbler: Oak and conifer woods Oct. and Nov.

MacGillivray's Warbler: Riparian thickets- Low Pass Aug. 31

Wilson's Warbler: Riparian thicket- Low Pass, Aug. 31

Western Tanager: Oak and conifer forests throughout- Aug. and Sept.

Lesser Goldfinch: Scrub near Gray Rocks - Sept. 2

Rufous-sided Towhee: Scrub, Riparian, oak woods - throughout.

Oregon Junco: Oak woods, conifer forest- Sept. Oct. Nov.

Chipping Sparrow: Scrub, Ponderosa pine forest. Brock Mtn. Rd. Sept.

White-crowned Sparrow: Woods, thickets in canyons, etc. Oct., Nov.

Golden-crowned Sparrow: Woods, thickets in canyons, etc. - Oct., Nov.

MAMMALS:

Trowbridge Shrew Sorex trowbridgei: may occur in wooded canyons, thickets

Vagrant Shrew Sorex vagrans: possible in woods and forests

Shrew-mole Neurotrichus gibbsii: may occur in moist canyon bottoms, slopes

Broad-handed Mole Scapanus latimanus: occurs in moist woods and valleys i.e. Low Pass and Madison Canyon.

Fringed Myotis Myotis thysanoides: possible in open woods

Long-eared Myotis Myotis evotis: possibie, foraging in woods

California Myotis Myotis californicus: probable in the area

Yuma Myotis Myotis yumaensis: possible, forages in open woods

Hairy-winged Myotis Myotis volans: may occur, flies in open forest

Small-footed Myotis Myotis subulatus: possible, hunts over scrub, open forest

Western Pipistrelle Pipistrellus hesperus: possible, forages over scrub, etc.

Big Brown Bat Eptesicus fuscus: may occur in the area.

Hoary Bat Lasiurus cinereus: possible in the area

Lump-nosed Bat Plecotus townsendii: possible in scrubby areas

Pallid Bat Antrozous pallidus: may occur in scrubby areas

Brazilian Free-tailed Bat Tadaria brasiliensis: may occur in scrub habitats

Black-tailed Hare Lepus californicus: may occur in scrub and open woods

Brush Rabbit Sylvilagus bachmani: possible in thickets, scrub, etc.

Beechey Ground Squirrel Otospermophilus beecheyi: found in openings in oak

woods and in limestone scrub, often in rocky areas

Yellow Pine Chipmunk Eutamias amonus: may occur in ponderosa pine forest

Sonoma Chipmunk Eutamias sonomae : may occur in scrub,Near eastern limits of it's range.

Western Gray Squirrel Sciurus griseus: common in oak and mixed conifer woods

Northern Flying Squirrel Glaucomys sabrinus: possible in forested areas

Botta Pocket Gopher Thomomys bottae: found in openings in oak woods,Gray Rocks, etc.

Heermann Kangaroo Rat Dipodomys heermanni: Possible in scrubby areas

Beaver Castor canadensis: evidence of beaver activity occurs at the mouth of Brock Creek

Western Harvest Mouse Reithrodontomys megalotus: possible in thickets, etc.

Deer Mouse Peromyscus maniculatus: occurs in woods and forest throughout

Brush Mouse Peromyscus boylei: possible in scrub and rocky areas

Pinyon Mouse Peromyscus truei: may occur in scrubland

Dusky-footed Wood Rat Neotoma fuscipes:occurs in woods,forest,and rocky scrub

Western Red-backed Mouse Clethrionomys occidentalis: may occur in deep woods

California Meadow Mouse Microtus californicus: possible in moist grassy spots

Porcupine Erethizon dorsatum: may occur in forested areas

Coyote Canis latrans: scats commonly found on trails in oak woods, scrub,etc.

Gray Fox Urocyon cinereoargenteus:possible in scrub and woods

Black Bear Ursus americanus: scats found on trails,in fall,containing manzanita berries.

Ringtail Bassariscus astutus: may occur in scrubby and rocky areas.

Raccoon Procyon lotor: may occur along streams or gullies

Long-tailed Weasel Mustella frenata: possible in all habitats

Spotted Skunk Spilogale putorius: a den was found in a crevice near Gray Rocks

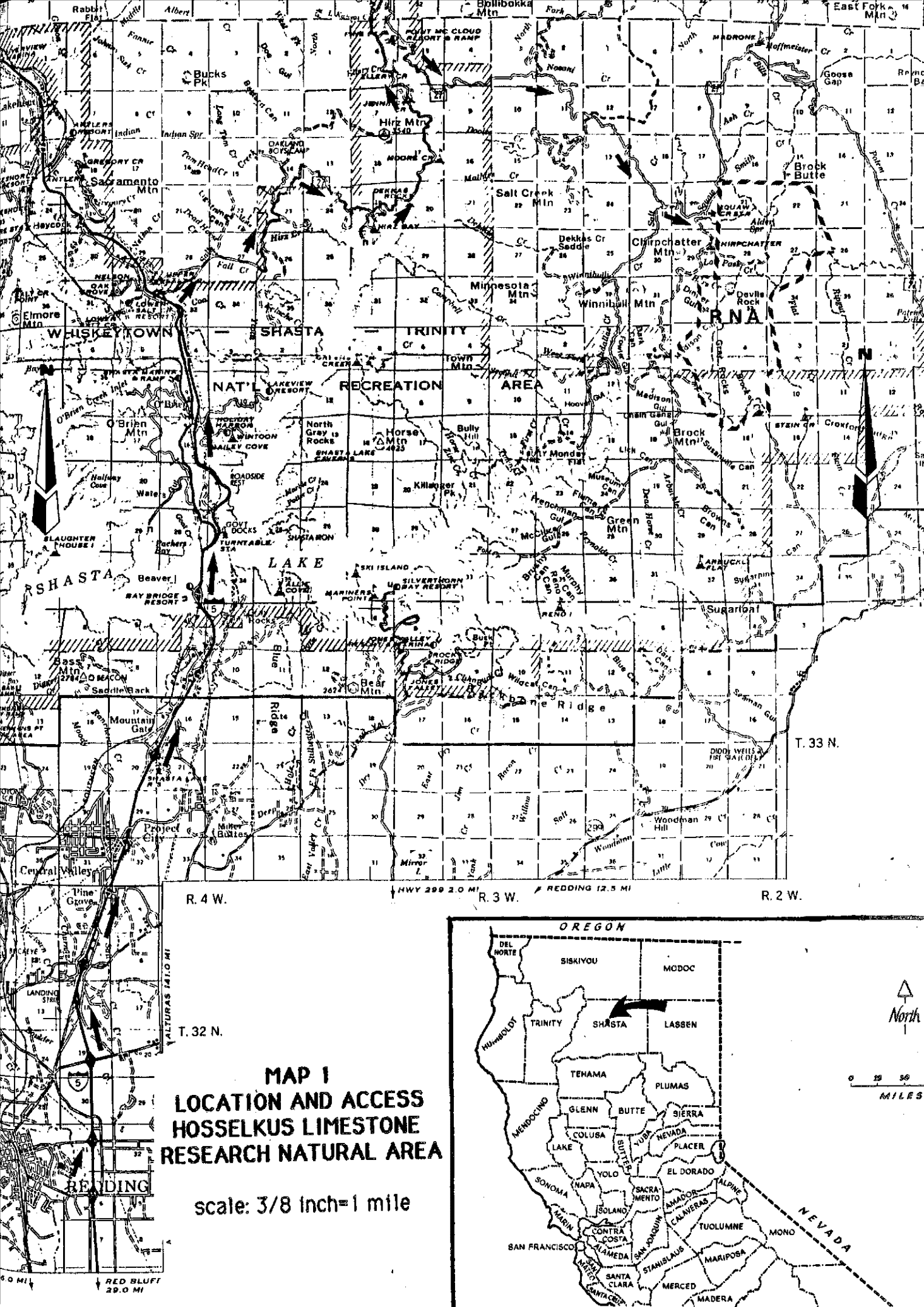
Striped Skunk Mephitis mephitis: possible in thickets and scrub

Mountain Lion Felis concolor: possible in all habitats

Bobcat Lynx rufus: possible in all habitats

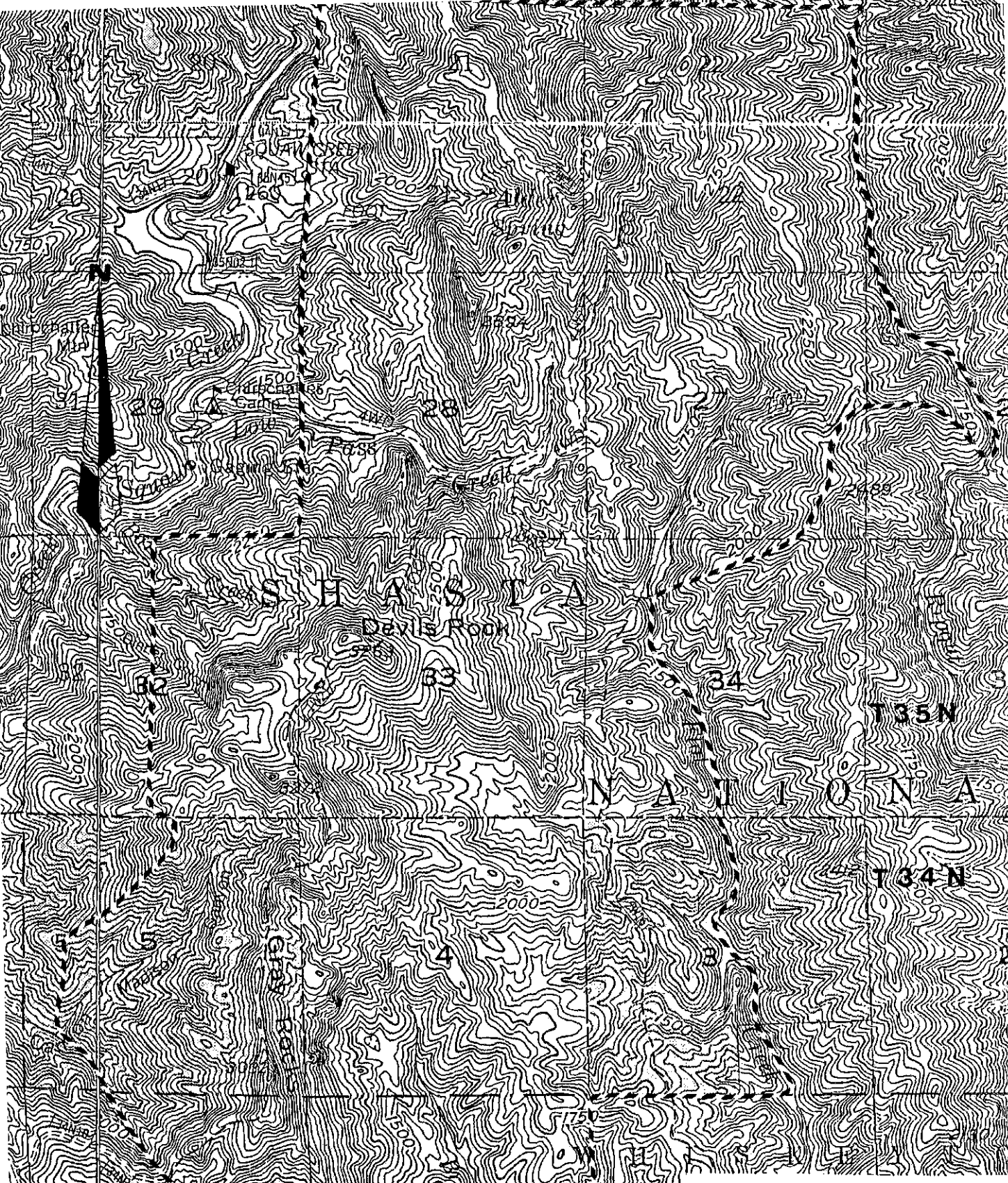
Elk Cervus canadensis: introduced in area,occasionally observed, in Brock Cr.

Mule Deer Odocoileus hemionus: occurs in scrub, forest,and woodland



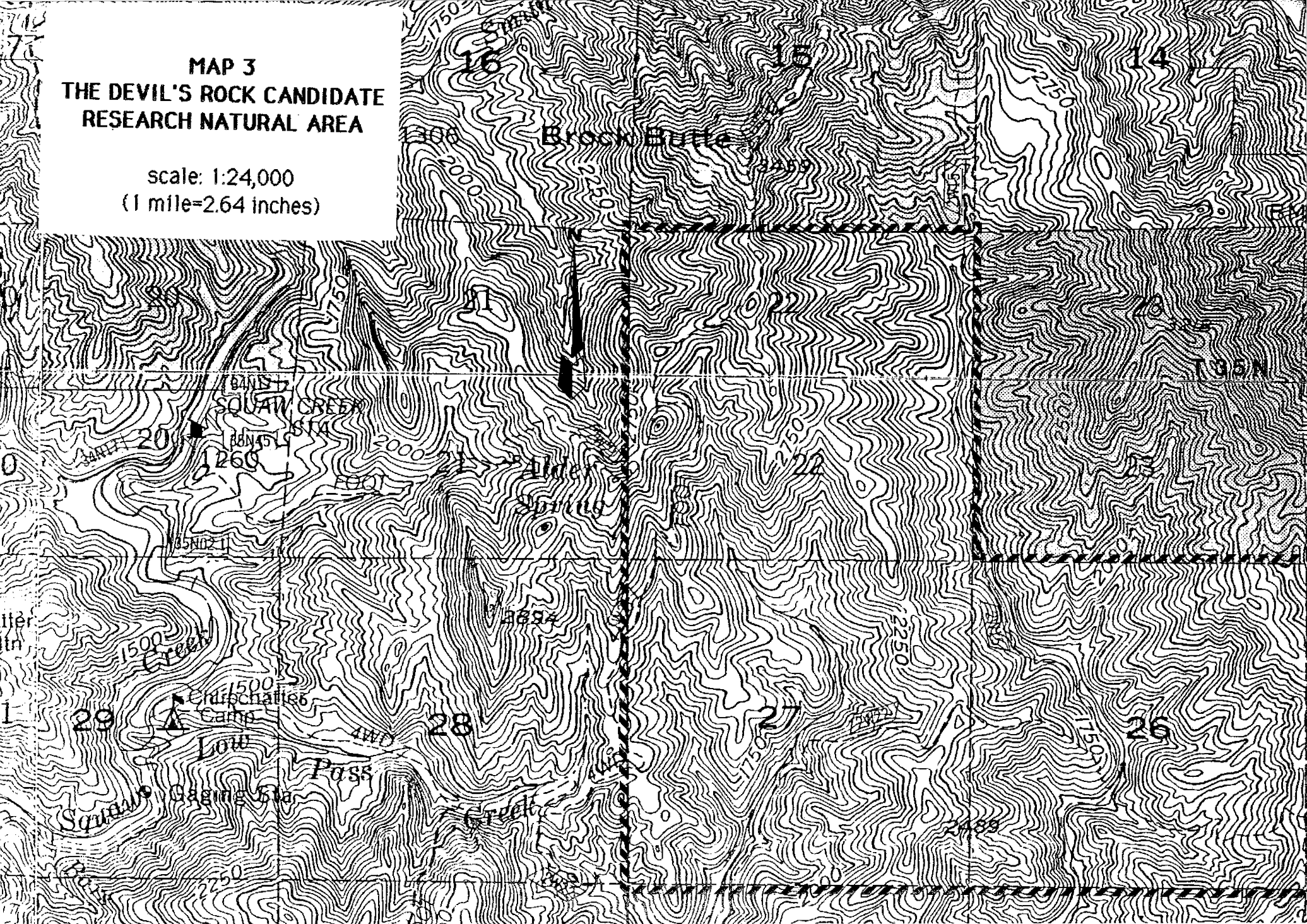
MAP 1
LOCATION AND ACCESS
HOSSELKUS LIMESTONE
RESEARCH NATURAL AREA

scale: 3/8 inch=1 mile



MAP 2
THE HOSSELKUS LIMESTONE
RESEARCH NATURAL AREA

scale: 1.97 inches= 1 mile

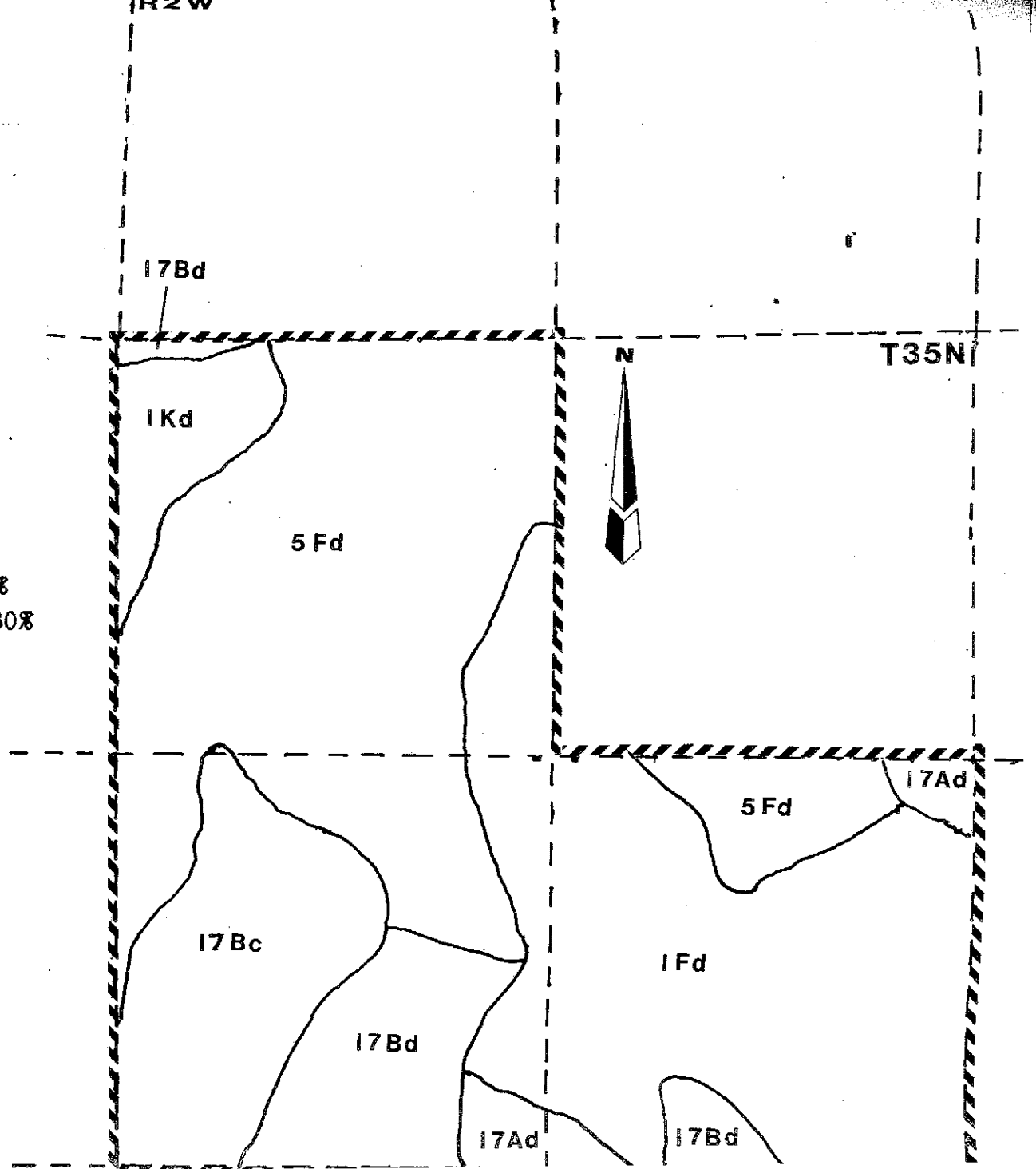

MAP 3
THE DEVIL'S ROCK CANDIDATE
RESEARCH NATURAL AREA
scale: 1:24,000
(1 mile=2.64 inches)
Brock Butte
Alder Spring
SQUAW CREEK
Squaw Creek
Gaging Sta
Low Pass
Cultivated Camp
4WD
T35N
16
15
14
21
22
23
28
27
26
29
20

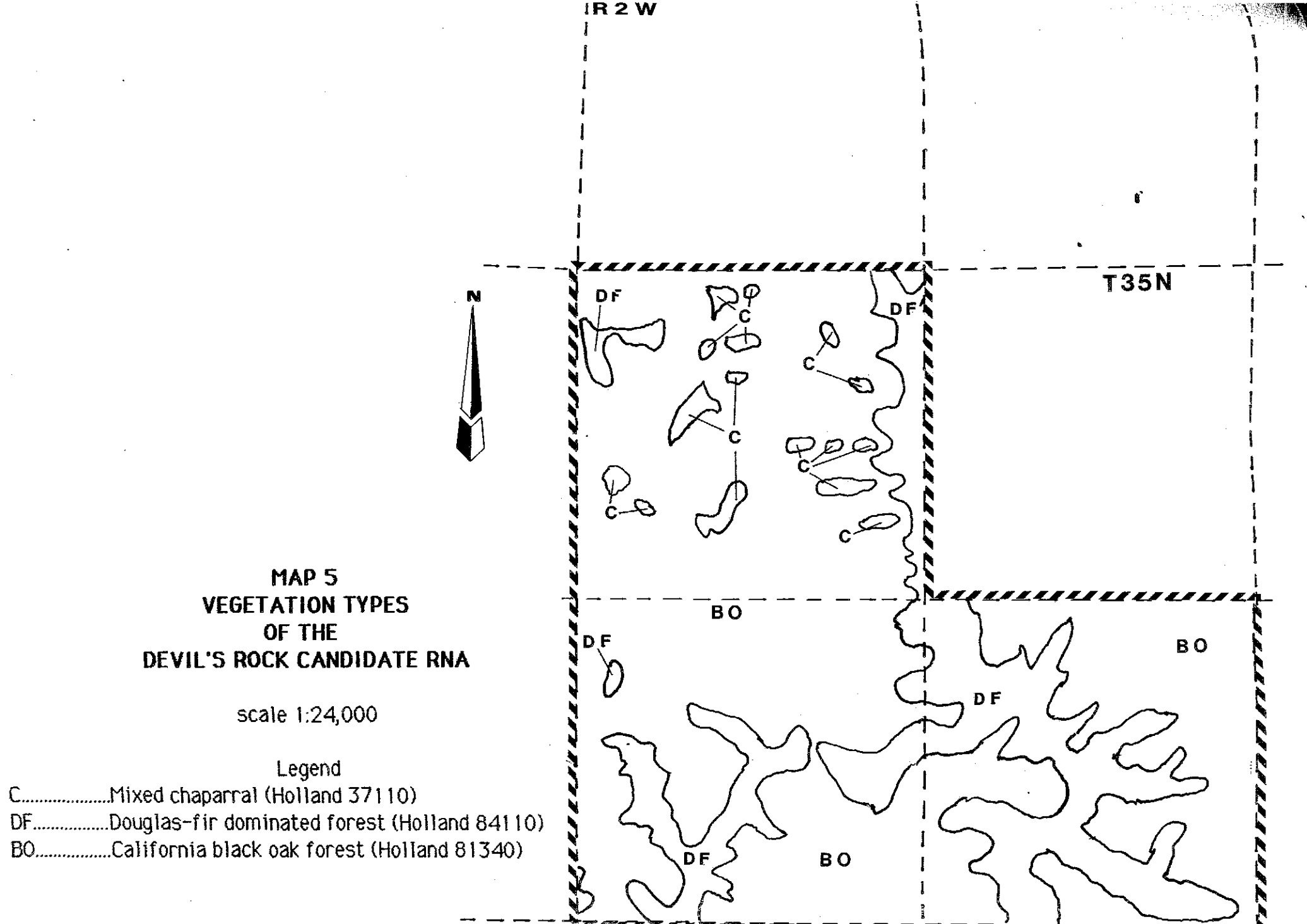
MAP 4
SOIL UNITS AT THE
DEVIL'S ROCK CANDIDATE RNA

scale: 1:24,000
(1 mile= 2.64 inches)

Legend

1Fd.....Neuns-Marpa very gravelly loams 60-80%
1Kd.....Neuns-Kindig very gravelly loams 60-80%
5Fd.....Deadwood family-Rock outcrop complex 60-80%
17Ad.....Marpa-Neuns very gravelly loams complex 60-80%
17Bc.....Marpa-Goulding family association 40-60%
17Bd.....Marpa-Goulding family association 60-80%





MAP 5
VEGETATION TYPES
OF THE
DEVIL'S ROCK CANDIDATE RNA

scale 1:24,000

Legend

C.....Mixed chaparral (Holland 37110)
DF.....Douglas-fir dominated forest (Holland 84110)
BO.....California black oak forest (Holland 81340)